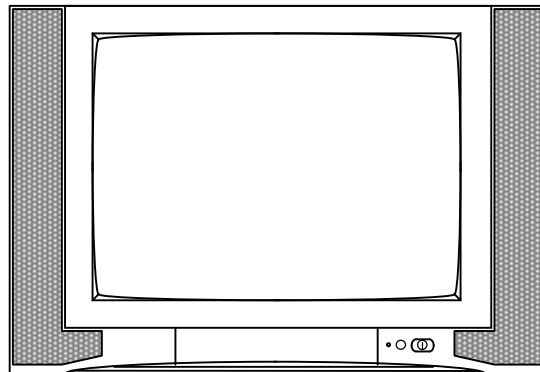


# KALLEY

K-TV21PF & K-TV29PF  
with NTSC/PALm/PALn

## SERVICE MANUAL



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# SAFETY PRECAUTIONS

1. The design of this product contains special hardware, many circuits and components specially for safety purposes. For continued protection, no changes should be made to the original design unless authorized in writing by the manufacturer. Replacement parts must be identical to those used in the original circuits. Service should be performed by qualified personnel only.
2. Alterations of the design or circuitry of the products should not be made. Any design alterations or additions will void the manufacturer's warranty and will further relieve the manufacturer of responsibility for personal injury or property damage resulting therefrom.
3. Many electrical and mechanical parts in the products have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in the parts list of Service manual. **Electrical components having such features are identified by shading on the schematics and by ( ! ) on the parts list in Service manual.** The use of a substitute replacement which does not have the same safety characteristics as the recommended replacement part shown in the parts list of Service manual may cause shock, fire, or other hazards
4. **Don't short between the LIVE side ground and ISOLATED (NEUTRAL) side ground or EARTH side ground when repairing.** Some model's power circuit is partly different in the GND. The difference of the GND is shown by the LIVE: ( ) side GND, ISOLATED (NEUTRAL) : ( ) side GND and EARTH : ( ) side GND. Don't short between the LIVE side GND and ISOLATED (NEUTRAL) side GND or EARTH side GND and never measure with a measuring apparatus (oscilloscope etc.) the LIVE side GND and ISOLATED (NEUTRAL) side GND or EARTH side GND at the same time. If above note will not be kept, a fuse or any parts will be broken.
5. If any repair has been made to the chassis, it is recommended that the B1 setting should be checked or adjusted (See ADJUSTMENT OF B1 POWER SUPPLY).
6. The high voltage applied to the picture tube must conform with that specified in Service manual. Excessive high voltage can cause an increase in X-Ray emission, arcing and possible component damage, therefore operation under excessive high voltage conditions should be kept to a minimum, or should be prevented. If severe arcing occurs, remove the AC power immediately and determine the cause by visual inspection (incorrect installation, cracked or melted high voltage harness, poor soldering, etc.). To maintain the proper minimum level of soft X-Ray emission, components in the high voltage circuitry including the picture tube must be the exact replacements or alternatives approved by the manufacturer of the complete product.
7. Do not check high voltage by drawing an arc. Use a high voltage meter or a high voltage probe with a VTVM. Discharge the picture tube before attempting meter connection, by connecting a clip lead to the ground frame and connecting the other end of the lead through a 10k $\Omega$  2W resistor to the anode button.
8. When service is required, observe the original lead dress. Extra precaution should be given to assure correct lead dress in the high voltage circuit area. Where a short circuit has occurred, those components that indicate evidence of overheating should be replaced. Always use the

9. manufacturer's replacement components.

## 10. Isolation Check

### (Safety for Electrical Shock Hazard)

After re-assembling the product, always perform an isolation check on the exposed metal parts of the cabinet (antenna terminals, video/audio input and output terminals, Control knobs, metal cabinet, screwheads, earphone jack, control shafts, etc.) to be sure the product is safe to operate without danger of electrical shock.

11. The surface of the TV screen is coated with a thin film which can easily be damaged. Be very careful with it when handle the TV. Should the TV screen become soiled, wipe it with a soft dry cloth. Never rub it forcefully. Never use any cleaner or detergent on it.

### (1) Dielectric Strength Test

The isolation between the AC primary circuit and all metal parts exposed to the user, particularly any exposed metal part having a return path to the chassis should withstand a voltage of 3000V AC (r.m.s.) for a period of one second. (...Withstand a voltage of 1100V AC (r.m.s.) to an appliance rated up to 120V, and 3000V AC (r.m.s.) to an appliance rated 200V or more, for a periode of one second.) This method of test requires a test equipment not generally found in the service trade.

### (2) Leakage Current Check

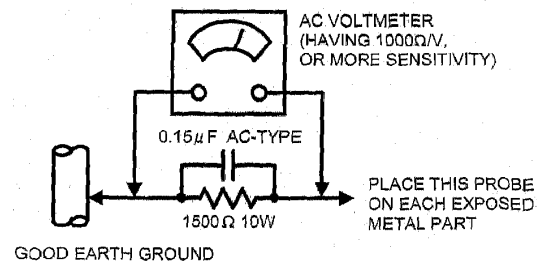
Plug the AC line cord directly into the AC outlet (do not use a line isolation transformer during this check.). Using a "Leakage Current Tester", measure the leakage current from each exposed metal part of the cabinet, particularly any exposed metal part having a return path to the chassis, to a known good earth ground (water pipe, etc.). Any leakage current must not exceed 0.5mA AC (r.m.s.). However, in tropical area, this must not exceed 0.2mA AC (r.m.s.).

#### ● Alternate Check Method

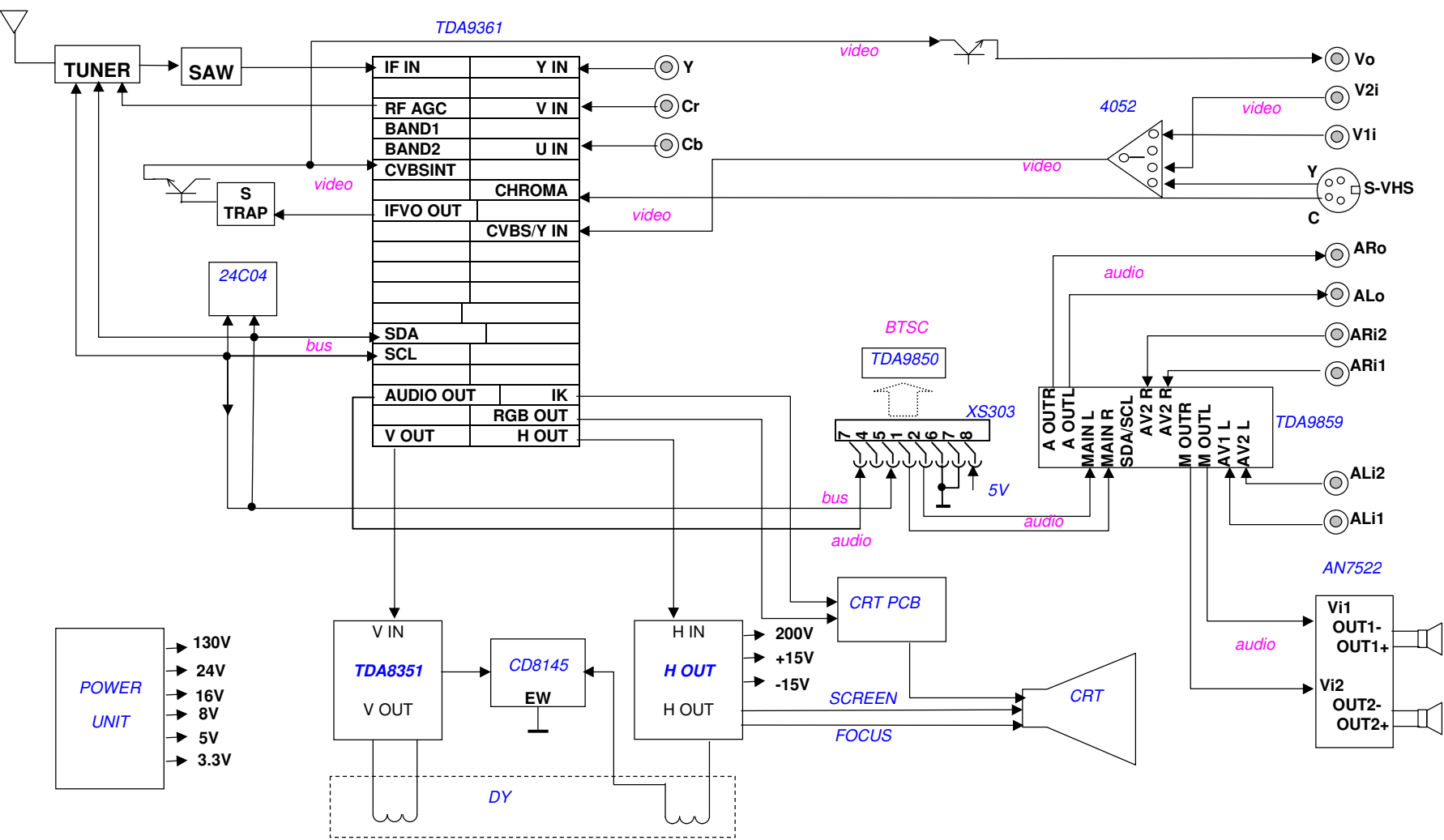
Plug the AC line cord directly into the AC outlet ( do not use a line isolation transformer during this check.). Use an AC voltmeter having 1000 ohms per volt or more sensitivity in the following manner. Connect a 1500 $\Omega$  10W resistor paralleled by a 0.15 $\mu$ F AC-type capacitor between an exposed metal part and a known good earth ground (water pipe, etc.). Measure the AC voltage across the resistor with the AC voltmeter. Move the resistor connection to each exposed metal part, particularly any exposed metal part having a return path to the chassis, and measure the AC voltage across the resistor. Now, reverse the plug in the AC outlet and repeat each measurement. Any voltage measured must not exceed 0.75V AC (r.m.s.). This corresponds to 0.5mA AC (r.m.s.).

However, in tropical area, this must not exceed 0.3V AC (r.m.s.).

This corresponds to 0.2mA AC (r.m.s.)



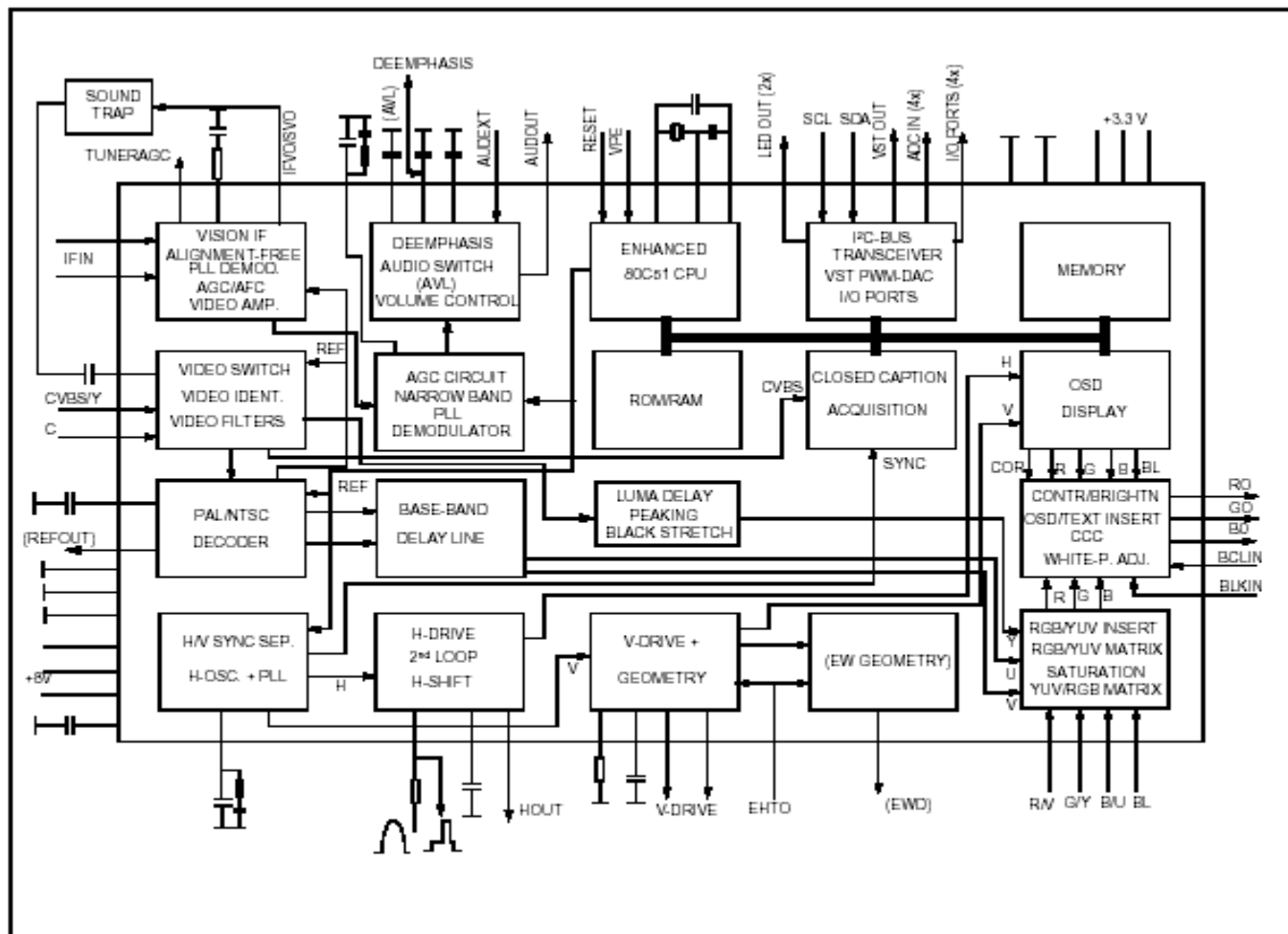
# 2 TV Block diagram for PALm/PALn



## PHILIPS UOC FUNCTIONAL DIFFERENCE BETWEEN THE VARIOUS IC VERSIONS

| IC VERSION                                                                                               | 9350       | 9351       | 9352       | 9353       | 9360       | 9361       | 9362       | 9363       | 9364       | 9365       | 9366       | 9367       | 9380       | 9381       | 9382       | 9383       | 9384       | 9385       | 9386       | 9387       | 9388       | 9389       | 9370       | 9373       | 9375       | 9377       | 9378       |
|----------------------------------------------------------------------------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| TV rang                                                                                                  | 90         | 90         | 90         | 110        | 90         | 90         | 110        | 110        | 110        | 110        | 90         | 90         | 90         | 90         | 90         | 110        | 110        | 110        | 110        | 90         | 110        | 110        | 90         | 110        | 110        | 90         | 110        |
| Mono inter-carrier multi-standard<br>Sound demodulator (4.5-6.5MHz)<br>With switch able centre frequency | √          | √          |            | √          | √          | √          | √          | √          |            |            |            |            | √          | √          |            | √          | √          |            |            | √          | √          |            | √          | √          |            | √          | √          |
| Audio switch                                                                                             | √          | √          |            | √          | √          | √          | √          | √          |            |            |            |            | √          | √          |            | √          | √          |            |            | √          | √          |            | √          | √          |            | √          | √          |
| Automatic volume leveling                                                                                | √          | √          | √          |            | √          | √          |            |            |            |            | √          | √          | √          | √          | √          |            |            |            |            | √          |            |            | √          |            |            | √          |            |
| Automatic volume leveling or<br>Subcarrier output (for comb filter<br>applications)                      |            |            |            | √          |            |            | √          | √          | √          | √          |            |            |            |            |            | √          | √          | √          | √          |            | √          | √          |            | √          |            |            | √          |
| QSS sound IF amplifier with<br>Separate input and AGC circuit                                            |            |            | √          |            |            |            |            |            | √          | √          | √          | √          |            |            | √          |            |            | √          | √          |            |            | √          |            |            | √          |            |            |
| AM sound demodulator without<br>Extra reference circuit                                                  |            |            |            |            |            |            |            |            |            | √          |            |            |            |            |            |            |            | √          |            |            |            |            |            |            |            |            |            |
| PAL decoder                                                                                              | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          |            |            |            | √          | √          | √          |            |            |
| SECAM decoder                                                                                            |            | √          | √          | √          |            | √          |            | √          |            | √          |            | √          |            | √          | √          |            | √          |            | √          |            |            |            |            |            |            |            |            |
| NTSC decoder                                                                                             | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          |
| Horizontal geometry(E-W)                                                                                 |            |            |            | √          |            |            | √          | √          | √          | √          |            |            |            |            |            | √          | √          | √          | √          |            | √          | √          |            | √          | √          |            | √          |
| Horizontal and vertical zoom                                                                             |            |            |            | √          |            |            | √          | √          | √          | √          |            |            |            |            |            | √          | √          | √          | √          |            | √          | √          |            | √          | √          |            | √          |
| ROM size                                                                                                 | 32-<br>64k | 32-<br>64k | 32-<br>64k | 32-<br>64k | 64-<br>128 | 64-<br>128 | 64-<br>128 | 64-<br>128 | 64-<br>128 | 64-<br>128 | 64-<br>128 | 64-<br>128 | 16-<br>64k | 16-<br>64k | 16-<br>64k | 16-<br>64k | 16-<br>64k | 16-<br>64k | 16-<br>64k | 16-<br>64k | 16-<br>64k | 16-<br>64k | 32-<br>55k | 32-<br>55k | 32-<br>55k | 32-<br>55k | 32-<br>55k |
| User RAM size                                                                                            | 1k         | 1k         | 1k         | 1k         | 2k         | 2k         | 2k         | 2k         | 2k         | 2k         | 2k         | 2k         | 1k         | 1k         | 1k         | 1k         | 1k         | 1k         | 1k         | 1k         | 1k         | 1k         | 2.25       | 2.25       | 2.25       | 2.25       | 2.25       |
| Teletext                                                                                                 | 1 p        | 1p         | 1p         | 1p         | 10p        | 10p        | 10p        | 10p        | 10p        | 10p        | 10p        | 10p        |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
| Closed captioning                                                                                        | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          | √          |

## Block diagram TDA93xX PS/N2 series with mono intercarrier sound demodulator



BLOCK DIAGRAM

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## 3.REPLACEMENT OF MEMORY IC

### 1. MEMORY IC.

This TV uses memory IC. In the memory IC are memorized data for correctly operating the video and deflection circuits.

When replacing memory IC, be sure to use IC written with the initial value of data.

### 2. PROCEDURE FOR REPLACING MEMORY IC

#### (1) Power off

Switch the power off and unplug the power cord from AC outlet.

#### (2) Replace IC

Be sure to use memory IC written with the initial data values.

#### (3) Power On

Plug the power cord into the AC outlet and switch the power On.

#### (4) Check and set SYSTEM default value:

- 1) Press "QV" key holding about 4 second and then press "MENU1" key on the Remote control unit. Or Press "TEST" key on the Remote control unit for factory used.
- 2) The "TEST" will be displayed on the screen.
- 3) Press digital key, (Mkey) and corresponding on-screen display will be appeared.  
Some time "PASSWORD" on-screen display will be appeared, you need to input 828.
- 4) Check the setting value of the SYSTEM default value of Table below. If the value is different, select items by [CH+]/[CH-] keys and set value by [VOL+]/[VOL-] keys.
- 5) Press "STANDBY" key again and return to the normal screen.

## 4.SERVICE ADJUSTMENT

### B1 POWER SUPPLY

1. Receive normal colour bar signal.
2. Connect DC voltmeter to VD541- and isolated ground.
3. Adjust potentiometer in power unit to get the voltage as 110V  $\pm$ 1.0V for 21 inch hereinafter,  
130  $\pm$ 1.0V for 25 inch upwards.

### FOCUS ADJUSTMENT

1. Receive a crosshatch signal.
2. While watching the screen, adjust the FOCUS VR to make the vertical and horizontal lines as fine and sharp as possible.

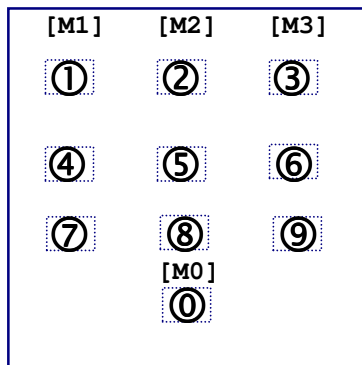
### EW ADJUSTMENT(only upper 25 inch)

1. adjust VR433 for horizontal size, to get 90% of horizontal picture contents would be displayed on CRT.
2. adjust VR432 for EW parabola, to straighten the vertical at the sides.
3. adjust VR431 for EW trapezium, to set the line at the sides vertical.

## BUS CONTROL ADJUSTMENT

1. first color value set to 0, then Press "TEST" key on the Remote control unit of factory.  
Press "0" to "9" key, (Mkey) and corresponding on-screen display will be appeared. But to enter M4-M9, Must input passcord 828.  
On TV screen "TEST" will be indicated, this means entered bus control mode.  
And press following key, each function will be available.
3. may be intered TEST mode with remote control unit of user, press QV key and hold 4 seconds. and then press MENU key, TV set may be entered TEST mode.

### Remote Hand Unit keys



#### [M1] menu

##### MENU0 Geometrical adjustment

Receive PAL standard Complete pattern signal.

Adjustment steps:

- a) Adjust V. SLOPE, to the center horizontal line just appeare from half bottom shadow.
- b) Adjust V. SIZE, to get 90% of vertical picture contents would be displayed on CRT.
- c) Adjust V. SHIFT, the center horizontal line correspond to CRT vertical center.
- d) Adjust H.SHIFT, to get the picture horizontal center correspond to CRT horizontal center.

**Receive NTSC signal and repeat above [M0] and [M1] adjustment.**

#### [M2] Menu

AGC Adjustment.

Receive 60dB  $\mu$  (1mV) $V_H$  colour bar pattern signal, adjust AGC value (voltage from high to low), to noise reduce gradually and just disappeared point.

#### [M3] Menu

CRTcut off and white balance adjustment.

Receive white signal.

- a) CRT cut off adjustment.
  1. Select "SC", then automatically vertical scan will be stopped.
  2. Adjust SCREEN control on Flyback transformer to get the darkest single horizontal line (red, green, or blue, sometimes shows more yellow, more purple or more white).
- b) White balance adjustment.
  1. Select RD/BD menu.
  2. Adjust RD/BD to get colour temperature as x=281, y=311
- c) Sub-Brightness adjustment. (Use stair case signal)
  1. Select SB menu.
  2. Adjust SB to get the darkest step being cutoff.

| MENU1   |    |
|---------|----|
| V.SLOPE | 31 |
| V.SHIFT | 31 |
| V. SIZE | 31 |
| V.S     | 31 |
| H.SHIFT | 31 |

## ICs Default Settings

a) TDA9370(STANDARD) EK cord=NTDA9370---2NA

| MI | Items        | Variable | Preset | MI | Items         | Variable | Preset |  |
|----|--------------|----------|--------|----|---------------|----------|--------|--|
| M1 | FREQUENCY    |          | 50HZ   | M5 | SUB Contrast  | 0~63     | 63     |  |
|    | V.SLOPE      | 0~63     | 31     |    | SUB color     | 0~63     | 63     |  |
|    | V.SHIFT      | 0~63     | 31     |    | SUB sharp     | 0~63     | 63     |  |
|    | V.SIZE       | 0~63     | 31     |    | SUBTINT       | 0~15     | 15     |  |
|    | V.S          | 0~63     | 31     |    | SUB Volume    | 0~63     | 63     |  |
|    | H.SHIFT      | 0~63     | 31     |    |               |          |        |  |
|    | OSD. V.POS   | 0~63     | 53     | M6 | OSO           | ON/OFF   | ON     |  |
|    | OSD.H.POS    | 0~59     | 15     |    | AGC-SPEED     | 0~3      | 2      |  |
|    | PROGRAM NO   |          |        |    | FFI           | ON/OFF   | OFF    |  |
|    |              |          |        |    | FSL           | ON/OFF   | ON     |  |
| M2 | AGC Takeover | 0~63     | 25     |    | FMWS          | ON/OFF   | OFF    |  |
|    | SHIPMODE     |          |        |    | PRO           | 0~3      | 0      |  |
|    |              |          |        |    | NTSC MX       |          | USA    |  |
| M3 | BT           | 0~63     | 48     |    |               |          |        |  |
|    | CT           | 0~63     | 48     | M7 | STANDARD BRI  | 0~63     | 48     |  |
|    | SC           |          | OFF    |    | STANDARD CONT | 0~63     | 48     |  |
|    | RB           | 0~63     | 32     |    | STANDARD COL  | 0~63     | 48     |  |
|    | GB           | 0~63     | 32     |    | SHARP BRI     | 0~63     | 48     |  |
|    | RD           | 0~63     | 32     |    | SHARP CONT    | 0~63     | 63     |  |
|    | GD           | 0~63     | 32     |    | SHARP COL     | 0~63     | 32     |  |
|    | BD           | 0~63     | 32     |    | SOFT BRI      | 0~63     | 32     |  |
|    | SB           | 0~63     | 40     |    | SOFT CONT     | 0~63     | 32     |  |
|    |              |          |        |    | SOFT COL      | 0~63     | 32     |  |
| M4 | BTSC-MODE    |          | STEREO |    |               |          |        |  |
|    | UOC VOLUME   | 0~63     | 34     | M8 | AV CFG*       | 0~8      | 3      |  |
|    | BTSC-ST      | 0~15     | 15     |    | YDLY PAL      | 0~15     | 12     |  |
|    | BTSC-SP      | 0~15     | 15     |    | YDLY AV       | 0~15     | 12     |  |
|    | BTSC-LI      | 0~15     | 12     |    | SC BRIGHT     | 0~63     | 10     |  |
|    | BTSC-A1      | 0~31     | 0      |    | CATHODE LEVEL | 0~15     | 10     |  |
|    | BTSC-A2      | 0~31     | 31     |    | HEADPHONE     | ON/OFF   | OFF    |  |
|    | BTSC-TC      | 0~7      | 3      |    | VM OPTION     | ON/OFF   | OFF    |  |
|    | BTSC-ST5     | 0~1      | 0      |    |               |          |        |  |
|    | BTSC-ADJ     | AUTO     |        | M9 | START ON      | 0~2      | 0      |  |
|    |              |          |        |    | START TIME    | 0~15     | 8      |  |
|    |              |          |        |    |               |          |        |  |
|    |              |          |        |    |               |          |        |  |
|    |              |          |        |    |               |          |        |  |

## 5. ICs functional description

### UOC TDA93XX

| SYMBOL                      | PIN | DESCRIPTION                                                                                                |
|-----------------------------|-----|------------------------------------------------------------------------------------------------------------|
| STAND BY output.            | 1   | In STAND BY mode, high level (Power OFF).<br>For Power ON this pin will be reduced to low.                 |
| SCL                         | 2   | I <sup>2</sup> C-bus clock line                                                                            |
| SDA                         | 3   | I <sup>2</sup> C-bus data line                                                                             |
| TUNING                      | 4   | tuning Voltage (Vt) PWM output                                                                             |
| P3.0/NTSC SW                | 5   | Port 3.0 or NTSC output/SCART SW input, Forced NTSC selection,<br>Low-level output, otherwise High output. |
| KEY                         | 6   | Control keys input *3                                                                                      |
| VOL                         | 7   | Sound Volume control PWM output                                                                            |
| MUTE                        | 8   | Sound mute output                                                                                          |
| VSSC/P                      | 9   | Digit ground for $\mu$ -controller core and periphery                                                      |
| BAND1                       | 10  | Tuner Band selection output                                                                                |
| BAND2                       | 11  | Tuner Band selection output                                                                                |
| VSSA                        | 12  | Analog ground of teletext decoder and digital ground of TV-processor                                       |
| SECPLL                      | 13  | SECAM PLL decoupling                                                                                       |
| VP2                         | 14  | 2 <sup>nd</sup> supply voltage TV-processor(+8V)                                                           |
| DECDIG                      | 15  | decoupling digital supply of TV-processor                                                                  |
| PH2LF                       | 16  | Phase-2 filter                                                                                             |
| PH1LF                       | 17  | Phase-1 filter                                                                                             |
| GND3                        | 18  | Ground 3 for TV-processor                                                                                  |
| DECBG                       | 19  | Band gap decoupling                                                                                        |
| AVL/EWD                     | 20  | Automatic volume leveling /EAST-WEST drive output                                                          |
| VDRB                        | 21  | Vertical drive B output                                                                                    |
| VDRA                        | 22  | Vertical drive A output                                                                                    |
| IFIN1                       | 23  | IF input 1                                                                                                 |
| IFIN2                       | 24  | IF input 2                                                                                                 |
| IREF                        | 25  | Reference current input                                                                                    |
| VSC                         | 26  | Vertical sawtooth capacitor                                                                                |
| TUNER AGC                   | 27  | Tuner AGC output                                                                                           |
| AUDEEM/SIFIN1 *1            | 28  | Audio deemphasis or SIF input                                                                              |
| DECSDEM/SIFIN2              | 29  | decoupling sound demodulator or SIF input 2                                                                |
| GND2                        | 30  | ground 2 for TV processor                                                                                  |
| SNDPLL/SIFAGC *1            | 31  | narrow band PLL filter or AGC sound IF                                                                     |
| AVL/SNDIF/REF0/<br>AMOUT *1 | 32  | Automatic Volume Levelling / sound IF input / subcarrier reference output / audio<br>deemphasis            |
| HOUT                        | 33  | horizontal output                                                                                          |
| FBISO                       | 34  | flyback input/sandcastle output                                                                            |

|                          |    |                                                                                       |
|--------------------------|----|---------------------------------------------------------------------------------------|
| AUDEXT/QSSO/<br>AMOUT *1 | 35 | external audio output / QSS intercarrier out                                          |
| EHTO                     | 36 | EHT/overvoltage protection input                                                      |
| PLL IF                   | 37 | IF-PLL loop filter                                                                    |
| IFVO/SVO                 | 38 | IF video output / selected CVBS output                                                |
| VP1                      | 39 | supply voltage TV processor                                                           |
| CVBS INT                 | 40 | internal CVBS input                                                                   |
| GND1                     | 41 | ground for TV processor                                                               |
| CVBS/Y                   | 42 | CVBS/Y input                                                                          |
| CHROMA                   | 43 | C input                                                                               |
| AUDOUT/AMOUT *1          | 44 | audio output /AM audio output (volume controlled)                                     |
| INSSW2                   | 45 | 2nd RGB / YUV insertion input                                                         |
| R2/VIN                   | 46 | 2nd R input / V (R-Y) input / Pr input                                                |
| G2/YIN                   | 47 | 2nd G input / Y input                                                                 |
| B2/UIIN                  | 48 | 2nd B input / U (B-Y) input / Pb input                                                |
| BCLIN                    | 49 | beam current limiter input                                                            |
| BLKIN                    | 50 | black current input / V-guard input                                                   |
| RO                       | 51 | Red output                                                                            |
| GO                       | 52 | Green output                                                                          |
| BO                       | 53 | Blue output                                                                           |
| VDDA                     | 54 | analog supply of Closed Caption decoder and digital supply of TV-processor<br>(3.3 V) |
| VPE                      | 55 | OTP Programming Voltage                                                               |
| VDDC                     | 56 | digital supply to core (3.3 V)                                                        |
| OSCGND                   | 57 | oscillator ground supply                                                              |
| XTALIN                   | 58 | crystal oscillator input                                                              |
| XTALOUT                  | 59 | crystal oscillator output                                                             |
| RESET                    | 60 | reset                                                                                 |
| VDDP                     | 61 | digital supply to periphery (+3.3 V)                                                  |
| P1.0/INT1                | 62 | TV/AV (AV1) / AV2 /S-VHS mode Output.                                                 |
| P1.1/T0                  | 63 | TV/AV (AV1) / AV2 /S-VHS mode Output.                                                 |
| P1.2/INT0                | 64 | Remote control signal input.                                                          |

#### Note

1. The function of pin 20, 28, 29, 31, 32, 35 and 44 is dependent on the IC version (mono intercarrier FM demodulator /QSS IF amplifier and East-West output or not) and on some software control bits. The valid combinations are given in table 1.
2. the vertical guard function can be controlled via pin 49 or pin 50. the selection is made by means of the IVG bit in subaddress 2BH.

**TABLE 1**

| IC version         | FM-PLL version |              |                  |              | QSS version                |          |           |        |          |           |
|--------------------|----------------|--------------|------------------|--------------|----------------------------|----------|-----------|--------|----------|-----------|
| East-West<br>Y/N   | N              |              | Y                |              | N                          |          |           | Y      |          |           |
| CMB1/CMB<br>0 bits | 00             | 01/10/1<br>1 | 00               | 01/10/1<br>1 | 00                         | 01/10/11 |           | 00     | 01/10/11 |           |
| AM bits            | -              | -            | -                | -            | -                          | 0        | 1         | -      | 0        | 1         |
| Pin 20             | AVL            |              | EWD              |              | AVL                        |          |           | EWD    |          |           |
| Pin 28             | AUDEEM         |              |                  |              | SIFIN1                     |          |           |        |          |           |
| Pin 29             | DECSDEM        |              |                  |              | SIFIN2                     |          |           |        |          |           |
| Pin 31             | SNDPLL         |              |                  |              | SIFAGC                     |          |           |        |          |           |
| Pin 32             | SNDIF(1<br>)   | REFO(2)      | AVL/SNDIF(1<br>) | REFO(2)      | AMOUT                      | REFO(2)  |           | AMOUT  | REFO(2)  |           |
| Pin 35             | AUDEXT         |              |                  |              | AUDEXT                     | QSS<br>O | AMOU<br>T | AUDEXT | QSS<br>O | AMOU<br>T |
| Pin 44             | AUDOUT         |              |                  |              | Controlled AM or audio out |          |           |        |          |           |

Note

1. When additional (external) selectivity is required for FM-PLL system pin 32 can be used as sound IF input. This function is selected by means of SIF bit in subaddress 28H.
2. the reference output signal is only available for the CMB1/CMB0 setting of 0/1. for the other settings this pin is a switch output(see also 5 table 67).

Pin No. 6: **Control keys input (Max. Limit voltage)**

| Function | POWER | MENU   | TV/AV | V-     | V+   | P-     | P+    |
|----------|-------|--------|-------|--------|------|--------|-------|
| Voltage  | 0     | 0.4125 | 0.825 | 1.2375 | 1.65 | 2.0625 | 2.475 |

**AN7522/7523**      Function : **audio output**

| Symbol     | PIN | Function        | Symbol     | PIN | Function        |
|------------|-----|-----------------|------------|-----|-----------------|
| Vcc        | 1   | Power supply    | GND        | 7   | ground          |
| Out 1 (+)  | 2   | Ch 1 output (+) | In 2       | 8   | Ch 2 input      |
| GND(out 1) | 3   | Ch 1 Ground     | VOL        | 9   | Volume Control  |
| Out 1 (-)  | 4   | Ch 1 output (-) | Out 2 (-)  | 10  | Ch 2 output (-) |
| Standby    | 5   | Mute input      | GND(out 2) | 11  | Ch 2 Ground     |
| In 1       | 6   | Ch 1 input      | Out 2 (+)  | 12  | Ch 2 output (+) |

Note: AN7523 is pin 1 to 9, AN7522 is pin 1 to 12.

**LA78040/78045**      Function : **vertical output**

| Symbol  | PIN | Function      | Symbol     | PIN | Function            |
|---------|-----|---------------|------------|-----|---------------------|
| INV IN  | 1   | Input         | V OUT      | 5   | Vertical output     |
| VCC1    | 2   | Power         | VCC2       | 6   | Output power supply |
| PUMP UP | 3   | Pump up power | NON INV IN | 7   | Negative feedback   |
| GND     | 4   | Ground        |            |     |                     |

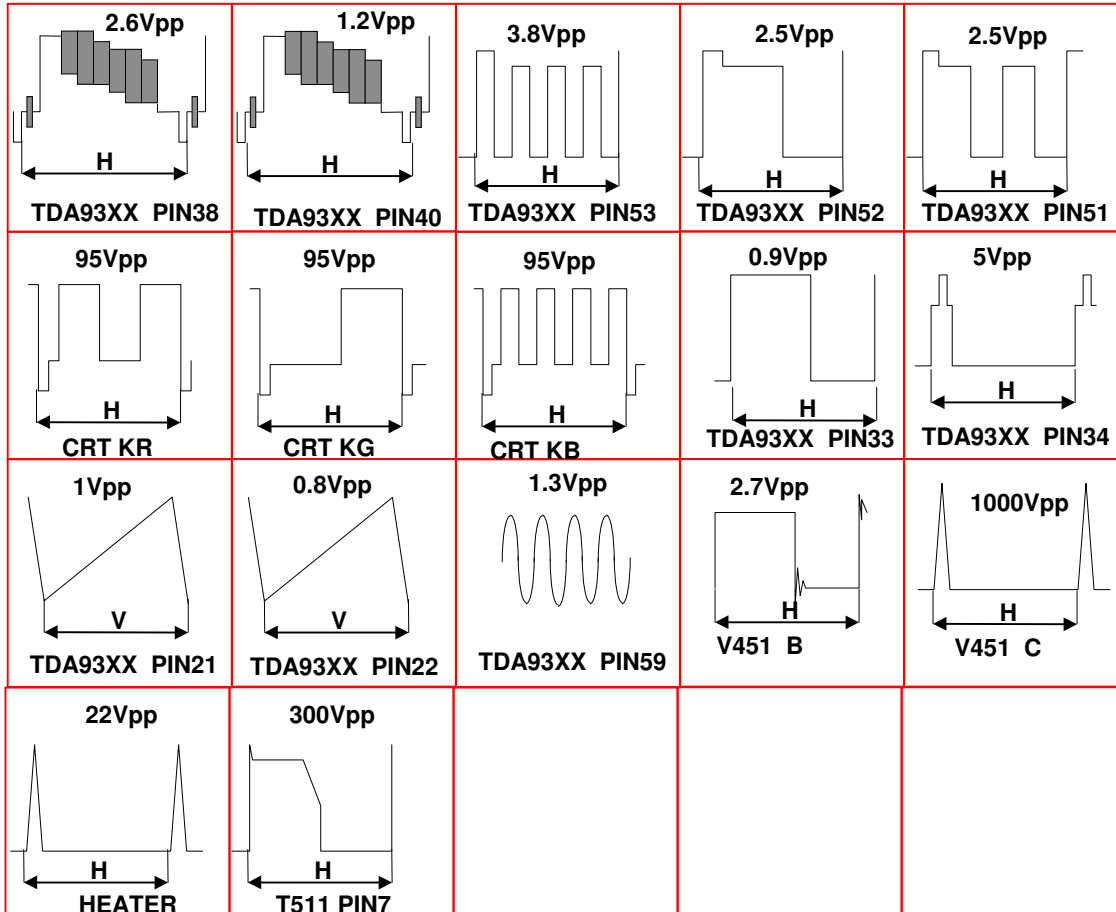
**TDA9859**      Function : **Universal Sound processor**

| Symbol      | Pin | Function               | Symbol      | Pin | Function              |
|-------------|-----|------------------------|-------------|-----|-----------------------|
| AV1L        | 1   | AV1 Audio Left input   | AV1R        | 32  | AV1 Audio input Right |
| P1          | 2   | Not used               | P2          | 31  | Not used              |
| MAINL       | 3   | Main Audio Left input  | AV2R        | 30  | AV2 Audio input Right |
| CSMO        | 4   | Smoothing Capacitor    | CPS1        | 29  | Pseudo stereo Cap. 1  |
| MAINR       | 5   | Main Audio Right input | AV2L        | 28  | AV2 Audio input Left  |
| VP          | 6   | Power Supply           | CPS2        | 27  | Pseudo stereo Cap. 2  |
| OUT R       | 7   | Right Output           | OUT L       | 26  | Left Output           |
| GND         | 8   | Ground                 | MAD         | 25  | Not used (GND)        |
| LINOR       | 9   | Line Output Right      | LINOL       | 24  | Line Output Left      |
| LINIR       | 10  | Line Input Right       | LINIL       | 23  | Line Input Left       |
| CBR1        | 11  | Bass Cap. Right 1      | CBL1        | 22  | Bass Cap. Left 1      |
| CBR2        | 12  | Bass Cap. Right 2      | CBL2        | 21  | Bass Cap. Left 2      |
| Headphone R | 13  | Headphone-R output     | Headphone L | 20  | Headphone-L output    |
| CTR         | 14  | Treble Cap. Right      | CTL         | 19  | Treble Cap. Left      |
| MAINOR      | 15  | Main Audio out Right   | MAINOL      | 18  | Main Audio out Left   |
| SCL         | 16  | I2C Bus clock          | SDA         | 17  | I2C Bus data          |

**CD 8145**      Function : **EW parabola correction**

| Symbol         | PIN | Function                     | Symbol     | PIN | Function                          |
|----------------|-----|------------------------------|------------|-----|-----------------------------------|
| Keystone input | 1   | Trapezium correction input   | NON INV IN | 8   | Non-inverting 100 ua Current sink |
| Sawtooth input | 2   | frame sawtooth current input | INV IN     | 7   | Parabola output Inverting input   |
| I ref          | 3   | Current reference            | VCC        | 6   | VCC                               |
| GND            | 4   | Ground                       | Output     | 5   | Output                            |

## 6. Test point Waveforms



## 7. IC voltages

TDA93XX

|            |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <b>PIN</b> | <b>1</b>  | <b>2</b>  | <b>3</b>  | <b>4</b>  | <b>5</b>  | <b>6</b>  | <b>7</b>  | <b>8</b>  | <b>9</b>  | <b>10</b> | <b>11</b> | <b>12</b> | <b>13</b> | <b>14</b> | <b>15</b> | <b>16</b> |
| <b>V</b>   | 2.8       | 3.8       | 3.6       | 3.3       | 3.5       | 3.5       | 0.1       | 0.1       | 0         | 5.4       | 0.1       | 0         | 2.3       | 8         | 5         | 3         |
| <b>PIN</b> | <b>17</b> | <b>18</b> | <b>19</b> | <b>20</b> | <b>21</b> | <b>22</b> | <b>23</b> | <b>24</b> | <b>25</b> | <b>26</b> | <b>27</b> | <b>28</b> | <b>29</b> | <b>30</b> | <b>31</b> | <b>32</b> |
| <b>V</b>   | 4         | 0         | 4         | 0.9       | 0.7       | 0.8       | 1.9       | 1.9       | 3.9       | 3.8       | 1.6       | 3.2       | 3.4       | 0         | 2.4       | 0.1       |
| <b>PIN</b> | <b>33</b> | <b>34</b> | <b>35</b> | <b>36</b> | <b>37</b> | <b>38</b> | <b>39</b> | <b>40</b> | <b>41</b> | <b>42</b> | <b>43</b> | <b>44</b> | <b>45</b> | <b>46</b> | <b>47</b> | <b>48</b> |
| <b>V</b>   | 0.6       | 0.5       | 3.7       | 1.7       | 2.4       | 3.1       | 8         | 3.8       | 0         | 3.4       | 1.5       | 3.6       | 2.3       | 2.6       | 2.6       | 2.6       |
| <b>PIN</b> | <b>49</b> | <b>50</b> | <b>51</b> | <b>52</b> | <b>53</b> | <b>54</b> | <b>55</b> | <b>56</b> | <b>57</b> | <b>58</b> | <b>59</b> | <b>60</b> | <b>61</b> | <b>62</b> | <b>63</b> | <b>64</b> |
| <b>V</b>   | 2.3       | 7.2       | 2.7       | 2.7       | 2.7       | 3.5       | 0         | 3.5       | 0.1       | 1.7       | 1.8       | 0         | 3.5       | 0.1       | 0.1       | 5         |

LA76040

|            |          |          |          |          |          |          |          |
|------------|----------|----------|----------|----------|----------|----------|----------|
| <b>PIN</b> | <b>1</b> | <b>2</b> | <b>3</b> | <b>4</b> | <b>5</b> | <b>6</b> | <b>7</b> |
| <b>V</b>   | 0.7      | 15       | -12      | -15      | 0.3      | 15.9     | -0.07    |

AN 7522

|            |          |          |          |          |          |          |          |          |          |           |           |           |  |
|------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|--|
| <b>PIN</b> | <b>1</b> | <b>2</b> | <b>3</b> | <b>4</b> | <b>5</b> | <b>6</b> | <b>7</b> | <b>8</b> | <b>9</b> | <b>10</b> | <b>11</b> | <b>12</b> |  |
| <b>V</b>   | 12       | 7        | 0        | 7        | 3.3      | 1.4      | 0        | 1.4      | 0        | 7         | 0         | 7         |  |

TDA9859

|            |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <b>PIN</b> | <b>1</b>  | <b>2</b>  | <b>3</b>  | <b>4</b>  | <b>5</b>  | <b>6</b>  | <b>7</b>  | <b>8</b>  | <b>9</b>  | <b>10</b> | <b>11</b> | <b>12</b> | <b>13</b> | <b>14</b> |
| <b>V</b>   | 4.0       | 0         | 4.0       | 8.0       | 4.0       | 8.0       | 4.0       | 0         | 4.0       | 4.0       | 4.0       | 4.0       | 4.0       | 4.0       |
| <b>PIN</b> | <b>15</b> | <b>16</b> | <b>17</b> | <b>18</b> | <b>19</b> | <b>20</b> | <b>21</b> | <b>22</b> | <b>23</b> | <b>24</b> | <b>25</b> | <b>26</b> | <b>27</b> | <b>28</b> |
| <b>V</b>   | 4.0       | 4.5       | 4.6       | 4.0       | 4.0       | 4.0       | 4.0       | 4.0       | 4.0       | 4.0       | 0         | 4.0       | 4.0       | 4.0       |
| <b>PIN</b> | <b>29</b> | <b>30</b> | <b>31</b> | <b>32</b> |           |           |           |           |           |           |           |           |           |           |
| <b>V</b>   | 4.0       | 4.0       | 0         | 4.0       |           |           |           |           |           |           |           |           |           |           |

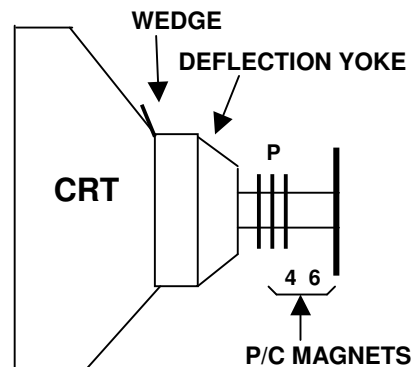
CD 8145

|            |          |          |          |          |          |          |          |          |
|------------|----------|----------|----------|----------|----------|----------|----------|----------|
| <b>PIN</b> | <b>1</b> | <b>2</b> | <b>3</b> | <b>4</b> | <b>5</b> | <b>6</b> | <b>7</b> | <b>8</b> |
| <b>V</b>   | 1.6      | 1.8      | 8.2      | 0        | 9.4      | 26.5     | 10       | 10       |

## 8. PURITY / CONVERGENCE ADJUSTMENT

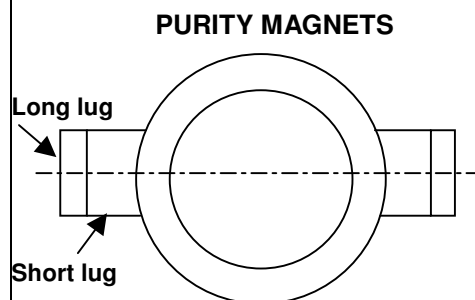
### PURITY ADJUSTMENT

1. Demagnetize CRT with the demagnetizer.
2. Loosen the retainer screw of the deflection yoke.
3. Remove the wedges.
4. Input a green raster signal from the signal generator, and turn the screen to green raster.
5. Move the deflection yoke backward.
6. Bring the long lug of the purity magnets on the short lug and position them horizontally. (Fig2)
7. Adjust the gap between two lugs so that the GREEN RASTER will come into the center of the screen. (Fig. 3)
8. Move the deflection yoke forward, and fix the position of the deflection yoke so that the whole screen will become green.
9. Insert the wedge to the top side of the deflection yoke so that it will not move.
10. Input a crosshatch signal.
11. Verify that the screen is horizontal.
12. Input red and blue raster signals, and make sure that purity is properly adjusted.



P: PURITY MAGNET  
 4: 4-POLES (convergence magnets)  
 6: 6-POLES (convergence magnets)

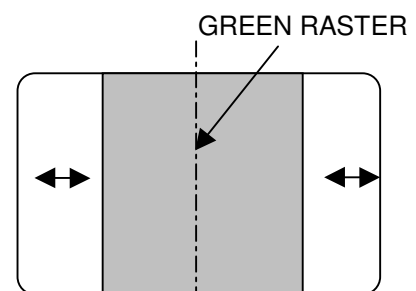
**Fig. 1**



Bring the long lug over the short lug  
 and position them horizontally.

**Fig. 2**

(FRONT VIEW)

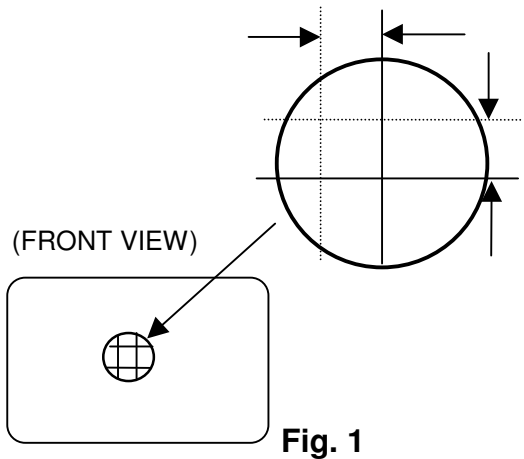


CENTER

**Fig. 3**

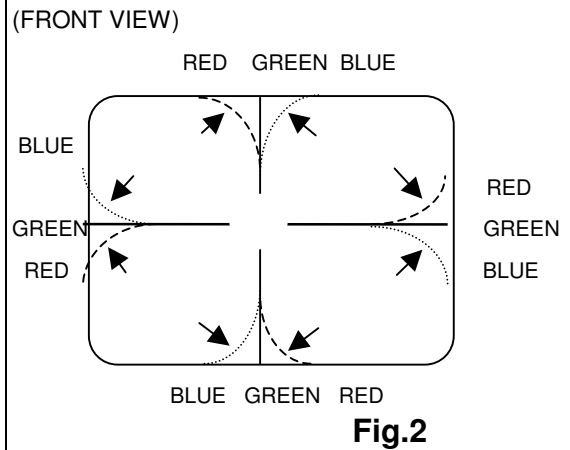
## STATIC CONVERGENCE ADJUSTMENT

1. Input a crosshatch signal.
2. Using 4-pole convergence magnets, overlap the red and blue lines in the center of the screen (Fig. 1) and turn them to magenta (red/blue).
3. Using 6-pole convergence magnets, overlap the magenta (red/blue) and green lines in the center of the screen and turn them to white.
4. Repeat 2 and 3 above, and make the best convergence.



## DYNAMIC CONVERGENCE ADJUSTMENT

1. Move the deflection yoke up and down and overlap lines in the periphery. (Fig. 2)
2. Move the deflection yoke left to right and overlap the lines in the periphery. (Fig. 3)
3. Repeat 1 and 2 above, and make the best convergence.



After adjustment, fix the wedge at the original position.  
Fasten the retainer screw of the deflection yoke.  
Fix the 6 magnets with glue.

